

### **AMENDMENTS TO THE CLAIMS**

1. (Previously presented) A corneal surgery apparatus comprising:
- an irradiation optical system having an irradiation reference axis, for irradiating onto a cornea a laser beam which brings about ablation of the cornea;
- alignment means for moving the irradiation optical system in X and Y directions with respect to a patient's eye to perform alignment in the X and Y directions and moving the irradiation optical system in a Z direction with respect to the patient's eye to perform alignment in the Z direction;
- detection means for detecting one of a pupil and a corneal limbus by picking up an image of an anterior-segment of the patient's eye and performing image processing thereon;
- a memory which stores a center and shape of the one of the pupil and the corneal limbus detected when the alignment in the X, Y and Z directions is performed;
- calculation means for obtaining X,Y positional deviation information on the eye based on change of a center of the one of the pupil and the corneal limbus detected during surgery from the center of the one of the pupil and the corneal limbus stored in the memory, then obtaining duction information on an eyeball based on change of a shape of the one of the pupil and the corneal limbus detected during the surgery from the shape of the one of the pupil and the corneal limbus stored in the memory and change in a slit image projected onto an iris from a symmetric direction so as to intersect with the irradiation optical axis, and then obtaining alignment deviation in the X and Y directions based on the obtained X,Y positional deviation information and the obtained duction information; and
- control means for operating the alignment means to perform the alignment in the X and Y directions based on the obtained alignment deviation in the X and Y directions.

2-7. (Cancelled)

8. (Currently amended) A corneal surgery apparatus comprising:
- an irradiation optical system having an irradiation reference axis, for irradiating onto a cornea a laser beam which brings about ablation of the cornea;

alignment means for moving the irradiation optical system in X and Y directions with respect to a patient's eye to perform alignment in the X and Y directions and moving the irradiation optical system in a Z direction with respect to the patient's eye to perform alignment in the Z direction;

detection means for detecting one of a pupil and a corneal limbus by picking up an image of an anterior-segment of the patient's eye and performing image processing thereon;

a memory which stores a center and shape of the one of the pupil and the corneal limbus detected when the alignment in the X, Y and Z directions is performed;

calculation means for obtaining X,Y positional deviation information on the eye based on change of a center of the one of the pupil and the corneal limbus detected during surgery from the center of the one of the pupil ~~or~~ and the corneal limbus stored in the memory, then obtaining duction information on an eyeball based on change of a shape of the one of the pupil and the corneal limbus detected during the surgery from the shape of the one of the pupil and the corneal limbus stored in the memory and change of at least three marks provided to a sclera and extending in meridional directions, and then obtaining alignment deviation in the X and Y directions based on the obtained X,Y positional deviation information and the obtained duction information; and

control means for operating the alignment means to perform the alignment in the X and Y directions based on the obtained alignment deviation in the X and Y directions.

9-18. (Cancelled)